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U.S. PATENT APPLICATION NO. 10/709,615
ATTORNEY DOCKET NO.:24.0910

Remarks:

Please reconsider the application in view of the above amendments and the following remarks.

Claim Rejections – 35 U.S.C. § 103(a)

Claims 1, 2, 8-11, 26-28 and 31-37 stand finally rejected as obvious over Inglis et al. (U.S. Pat. No. 3,654,768 – “Inglis”) in view of DiFoggio (U.S. Pat. No. 6,672,093). To the extent the rejection may still apply to the claims as amended, the Applicant respectfully traverses the rejection for the reasons which follow.

Generally, the Applicant’s invention relates to vortex-tube cooling devices associated with a well logging instrument disposed in a wellbore. The Applicant’s invention includes a first pressure chamber coupled to a vortex tube. The vortex tube is coupled to a second pressure chamber. The vortex chamber is coupled to a cooling chamber. The first and second pressure chambers are configured to stimulate flow of cooling fluid into the cooling chamber. All of the foregoing are disposed in a housing configured to move through or be disposed in a wellbore.

The Applicant’s invention addresses a particular limitation associated with vortex tubes used as cooling devices in well logging instruments, namely, that prior art uses of such tubes for cooling purposes required connection to the surface of fluid lines in order to operate the vortex tube. The Applicant’s invention addresses such limitation by providing a first gas storage chamber and a second gas storage chamber configured to stimulate cool fluid flow into the cooling chamber, where all the components are disposed within the instrument housing.

With respect to claim 1 prior to amendment, it was asserted on the Office Action that Inglis shows all the elements of the claim, including a first pressure chamber, a second pressure chamber, a vortex tube and a cooling chamber. All that was purportedly missing in the disclosure of Inglis was the housing. The term “pressure chamber” was construed to mean a chamber having a pressure therein. Applicant has amended claim 1 to restate the chambers according to their function with respect to the invention as “gas storage” chambers.

Inglis discloses a vortex-tube cooling system for electrical enclosures. The vortex tube cooling cold fluid discharge is conducted to the interior of an electrical enclosure. The cold fluid cools the interior of the enclosure, whereupon the fluid that has absorbed heat from the electrical components in the enclosure is discharged from the enclosure. Inglis does not disclose several elements of the invention of claim 1. First, there is no first gas storage chamber. "Gas storage" chamber as that term is used in the Applicant's invention is clearly a sealed enclosure that is capable of storing fluid under pressure, whether the fluid is liquid or gas. Such fluid under pressure is carried within the housing. Inglis uses a conventional, external source of pressurized gas (air) to actuate the vortex tube when a suitable valve is opened. There is nothing in Inglis to suggest that the pressurized fluid source is stored within any housing associated with the cooling system.

Further, the exhaust gas from the vortex tube is ultimately discharged to the atmosphere and not to a storage chamber. Inglis does disclose that cool air from the electrical enclosure and hot gas from the hot fluid outlet of the vortex tube are admixed to increase the efficiency of the vortex tube, but ultimately these gases are released at atmospheric pressure. Any reference to "chamber" in Inglis is with reference to such admixing volumes, and is clearly not a "gas storage chamber" as that term is used in the Applicant's amended claims.

The device identified as a "pressure chamber" (92) is actually described in Inglis at col. 8, ll. 32-43 as an annular chamber which admits compressed air (from outside the cooling system) into the vortex tube. The annular chamber is not a gas storage chamber within the meaning of that term as the Applicant has used it in the amended claims. The second element (54) identified as a "pressure chamber" is in fact an admixing chamber that is vented to the atmosphere. See Inglis col. 5, lines 59-70. Therefore the chamber 54 is not a gas storage chamber as that term is used in the Applicant's invention. Accordingly, two affirmative elements of claim 1 are not disclosed in Inglis, namely, the first and second pressure chambers.

The Applicant believes that the specification fully supports the definition of the term gas storage chamber as that term is used in the amended claims. Such support is found in paragraph [0026] which reads:

In applications where exposure to high temperatures is only for a limited period of time, cooling is similarly required for a brief period of time. A passive vortex tube cooling system is suitable for such applications. FIG. 3 shows a passive cooling system 50 embodiment of the invention. In this embodiment, the compressor 52 (see FIG. 2) does not exist. The low-pressure chamber 54 is evacuated and the high-pressure 56 chamber is pre-pressurized. During operation, the vortex tube 60 provides cooling until the pressure in the low-pressure chamber 54 becomes too high for adequate fluid flow through the vortex tube 60. The control valves 64, 68 serve the same purpose as described with respect to FIG. 2. The hot fluid stream from the vortex tube 60 is routed to the ambient environment. FIG. 4 shows another passive cooling system 50 embodiment of the invention. This embodiment is similar to that of FIG. 3, with the addition of a heat exchanger 70 and an intermediate high-pressure chamber 58 as described with respect to FIG. 2. The control valves of these embodiments serve the same purpose.

DiFoggio shows a well logging instrument cooled by a water vaporization system associated with a sorbent to absorb water vapor generated by the vaporization system. To the extent DiFoggio is relied upon to provide the missing elements of claim 1 not shown in Inglis, as the Applicant has explained above, Inglis lacks disclosure of more than the housing that is purportedly shown in DiFoggio. Even if the system disclosed in Inglis were somehow to be combined with the coolable housing shown in DiFoggio, a device resulting only from the combined disclosures would still require an external source of pressurized fluid, and a place for the pressurized fluid to go after it has passed through the vortex chamber.

The Applicant therefore believes that claim 1 is not obvious over Inglis in view of DiFoggio.

Claims 2-5, and 7-13 ultimately depend from claim 1 and are believed to be patentable over Inglis in view of DiFoggio for at least the same reasons advanced with respect to claim 1.

Claim 26 recites a method in which the structural elements of claim 1 are provided within a housing and are operated according to the functions attributed to them in the Applicant's specification. Claim 26 is believed to be patentable for at least the same reasons explained above.

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with reference to claim 1 because there is no first and second pressure chamber shown in Inglis or DiFoggio.

Claims 27-37 ultimately depend from claim 26 and are believed to be patentable for at least the same reasons advanced with respect to claim 26.

The Applicant respectfully requests reconsideration of claim 6 on the merits, notwithstanding the previous election of invention without traverse. Claim 6 depends from claim 5, which the Examiner has already found to recite patentable subject matter, and ultimately from claim 1, which the Applicant believes has been shown to be patentable over the prior art made of record.

Claims 14-25, drawn to a previously non-elected invention, have been canceled.

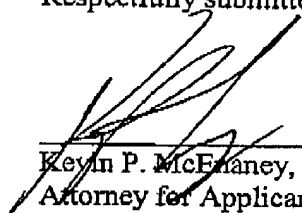
New independent claim 38 recites the subject matter of claim 5 in independent form, including all the limitations of claim 1. Claim 5 was found by the Examiner to recite allowable subject matter and as a result the Applicant believes that claim 38 is allowable over the art of record. New claims 39-48 recite subject matter corresponding to claims 2-4, 7-13 and 6, respectively. Because claim 38 is believed to be allowable, claims 39-48 are believed to be allowable for at least the same reasons as claim 38.

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The Applicant believes that this Reply is fully responsive to each and every ground of rejection or objection set forth in the Office Action of January 18, 2007 and respectfully requests early favorable action on this application.

Respectfully submitted,

Date: March 2, 2007



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